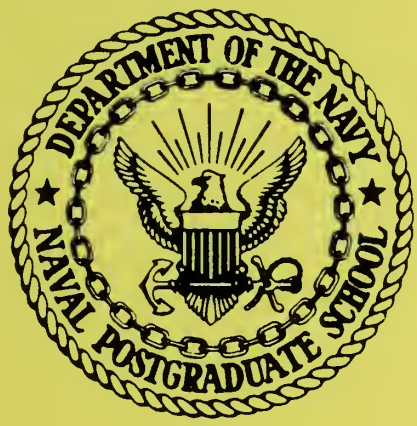
NPS-56-88-016

NAVAL POSTGRADUATE SCHOOL

Monterey, California



DOES NEW TECHNOLOGY LEAD TO WAR?

by

JAMES JOHN TRITTEN

JUNE 1988

Prepared for:
Director, Net Assessment
Office of the Secretary of Defense
Washington, DC 20301

NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

Rear Admiral Robert C. Austin
Superintendent

Kneale T. Marshall
Acting Provost

The work reported herein was supported by the Director, Net Assessment in the Office of the Secretary of Defense.

This report was prepared by:

REPORT DOCUMENTATION PAGE

a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	1b RESTRICTIVE MARKINGS
a. SECURITY CLASSIFICATION AUTHORITY	3 DISTRIBUTION / AVAILABILITY OF REPORT Approved for public release; distribution unlimited
b. DECLASSIFICATION / DOWNGRADING SCHEDULE	
PERFORMING ORGANIZATION REPORT NUMBER(S) NPS-56-88-016	5 MONITORING ORGANIZATION REPORT NUMBER(S)
a. NAME OF PERFORMING ORGANIZATION Naval Postgraduate School 6b OFFICE SYMBOL (*If applicable*)	7a NAME OF MONITORING ORGANIZATION
c. ADDRESS (*City, State, and ZIP Code*) Monterey, CA 93943-5100	7b. ADDRESS (*City, State, and ZIP Code*)
a. NAME OF FUNDING / SPONSORING ORGANIZATION Director, Net Assessment 8b. OFFICE SYMBOL (*If applicable*) OSD/NA	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER MIPR no. DWAM 70105
c. ADDRESS (*City, State, and ZIP Code*) Office of the Secretary of Defense Washington, DC 20301	10. SOURCE OF FUNDING NUMBERS PROGRAM ELEMENT NO. / PROJECT NO. / TASK NO / WORK UNIT ACCESSION NO

1. TITLE (*Include Security Classification*)
DOES NEW TECHNOLOGY LEAD TO WAR?

2. PERSONAL AUTHOR(S)
JAMES J. TRITTEN

13a. TYPE OF REPORT	13b TIME COVERED	14. DATE OF REPORT (*Year, Month, Day*)	15 PAGE COUNT
FINAL REPORT	FROM APR 88 TO JUN 88	1988 JUNE 30	7

6. SUPPLEMENTARY NOTATION

17. COSATI CODES			18 SUBJECT TERMS (*Continue on reverse if necessary and identify by block number*)
FIELD	GROUP	SUB-GROUP	TECHNOLOGY WAR

9. ABSTRACT (*Continue on reverse if necessary and identify by block number*)

Discussion of new technologies leading to wars. Historical case studies are reviewed with four alternate responses suggesting that nations do not go to war when faced with an enemy having developed a new technology of such significance that the very nature of war might change. Conclusions are offered.

0. DISTRIBUTION / AVAILABILITY OF ABSTRACT ☒ UNCLASSIFIED/UNLIMITED ☐ SAME AS RPT ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
2a. NAME OF RESPONSIBLE INDIVIDUAL JAMES J. TRITTEN, CHAIRMAN, NSA	22b TELEPHONE (*Include Area Code*) (408) 646-2521/2949 22c. OFFICE SYMBOL Code 56Tr

☆ U.S. Government Printing Office: 1986—606-243

DOES NEW TECHNOLOGY LEAD TO WAR?

by

James John Tritten

The sea services face a technological revolution with state-of-the-art computers, composite materials, superconductors, and countless other innovations that have the prospect of changing the nature of military service and the lives of those who serve. From time to time, emerging technologies have revolutionized the very nature of warfare itself--i.e., not merely changing the nature of military service and the lives of those who serve but the very nature of how wars are fought.

The Soviet response to the U.S. Strategic Defense Initiative (SDI) includes statements that a revolution in military affairs might occur if SDI were ever to be implemented as an operational program. Strategic planners should not simply dismiss Soviet rhetoric against new technological innovations such as SDI, Trident-II, sea-launched cruise missiles, etc. without first considering the impact of new systems on the campaigns likely to be fought and the nature of war itself.

For example, although one can argue that improvements in warhead accuracy planned for the Trident II are actually only marginal, many critics feel that new technologies will allow the U.S. Navy to perform different roles and missions than could be achieved with earlier systems. SDI could lead to new technologies which would certainly have major impact on the nature of campaigns to be fought. One can even argue that a

revolution in military affairs would occur with the shift from an offense-dominant world to a defense-dominant one.

At some point, analysts must scrutinize the Soviet rhetoric and ascertain what type of signal is being sent to the U.S. Are the Soviets telling us that the new technology is so upsetting that they feel this new technology is unacceptable? If so, is there a risk that military action would be undertaken to prevent that new technology from being used prior to its being fielded by us?[1] We all remember the assertive disarmament actions taken by Israel a few years ago to prevent Irag from attaining a nuclear weapons capability.

Studies exist that discuss the behavior of nations faced with new technological threats when already engaged in war. At least one study exists that looks into how "nations react during peacetime when a potential adversary develops or acquires a technological weapon or weapons system that it feels threatens to alter the military balance of power."[2]

Examples of such technological innovations are:

(1) British and French rifled handguns
(2) Prussian breech-loading rifles and steel artillery
(3) French application of steam propulsion and screw propellers
(4) French seagoing ironclad fleet
(5) British Dreadnought
(6) French development of submarine as warship
(7) British adaptation of airplane for war
(8) Germany splitting the atom
(9) U.S. monopoly on atomic weapons
(10) U.S. thermonuclear research
(11) Superpower monopoly of nuclear weapons
(12) Superpower development of world-wide nuclear weapons delivery capability.

The above list reflects a major technological innovation that was capitalized on by one country during peacetime and whose presence was known to a potential adversary. When nations know that such an innovation is taking place and a potential adversary is about to field a military capability that threatens to upset the existing military balance--do they go to war to prevent that unfavorable change?

History tells us that, instead of reacting with preemptive strikes, nations tend to react in one or more of the following ways. First, they obtain the technology for themselves through development, purchase, or espionage. This is the classic action-reaction Richardson arms race model. Rifled handguns and breech-loading rifles and steel artillery quickly were adopted by other nations after their worth was thoroughly demonstrated in battle. The British adapted steam propulsion and screw propellers more quickly and over a wider portion of their fleet than did the French. In 1882 Chile purchased a cruiser from the British that was superior to any comparable ship in the Royal Navy. Germany built her own Dreadnoughts. The Soviet Union, British, French, and Chinese have been able to develop their own nuclear weapons capability and delivery systems.

The second way in which nations actually react when faced with a technological innovation by a potential enemy is to negate that technological advantage through alternative technologies of their own or by forming political alliances to counterbalance the technologically superior state. French ironclads were countered

by British armor-piercing shells and coastal defenses. Nuclear weapons were countered by alliances for a common defense.

A third response is to negotiate with the technologically superior state to either prevent full implementation of the new technology or to somehow restore the political balance of power. China attempted (unsuccessfully) to obtain nuclear weapons technology from the Soviet Union. The Soviet Union uses arms control negotiations to enter the U.S. defense debate and delay or prevent new technologies from being fielded. The British argued in 1945 that new nuclear weapons technologies should be placed under international controls. They then cemented their position with the United States thus ensuring access to the technology. NATO and the Warsaw Pact are attempts to ensure a balance of power despite ever changing technological advantages.

The final response of nations to potentially dangerous technology is to do nothing. This option is chosen if nations do not feel that developing the technology themselves is within their capabilities or if they are willing to live with the altered balance of power. There are many examples of nations not taking advantage of a technology first developed by their own scientists. As in the case of rifled handguns, breech-loading riles and steel artillery, the submarine, and the airplane, it sometimes takes an actual war before nations fully understand the effect of new technologies causing other nations (or themselves) to react.

Although a team of German physicists split the atom in late 1938 and this fact was communicated to President Franklin Roosevelt who responded by forming an interagency advisory committee, it was not until October 1941 that the United States government approved atomic weapons research and planning. Sweden is a classic example of a nation that obviously has the capability to develop nuclear weapons but chooses not to do so.

There seem to be some major lessons here for strategic planners attempting to wrestle with the effect of new technologies on warfare. The first is that nations cannot prevent the transfer of technology but can merely raise the cost of such transfers and delay their completion. Historical case studies of the loss of technologies to enemies in wartime suggest that we cannot even count on preventing the loss of technology to a wartime enemy.[3] The second lesson is that maintaining an adequate research and development base within the government and in the private sector are long-term strategic goals that cannot be sacrificed. Although we should not plan on mobilizing such resources to come up with critical war-winning new technologies during actual armed conflict, we need to have that capability both during peacetime and during an armed conflict to capitalize on any opportunities.

Third, the decisive role appears to be man in the overall man-military technology system.[4] New technologies are developed and ignored or developed and traded away, or limited, or developed and misused--all by actions taken by man. This suggests that the military needs to not only educate superb

technicians but also strategists and planners at the operational or campaign level of warfare who can understand the nature of new technologies and advise decisionmakers on their net worth.[5]

Fourth, innovative technologies should be exploited and made an integral part of our new Competitive Strategies approach to the long-term competition with the Soviet Union. The Soviets appear to feel that we have started the third revolution in military affairs due to the impact of new conventional war fighting technologies.[6] Are we prepared to manage this revolution to maximize its benefits?

Finally, history suggests that we should feel free to pursue all imaginable military technologies without serious fear of causing a pre-emptive strike against us prior to fielding these technologies in operational systems. Although assuming that history will repeat itself is a poor planning assumption, the historical analogy and extrapolation in this case should be accepted as long as intelligence analysts are cautioned to still look for indicators.

NOTES

1. Sir Michael Howard "War and Technology," RUSI - Journal of the Royal United Services Institute for Defence Studies, Vol. 132, No. 4, December 1987, pp. 17-22. Professor Howard suggests that Germany may have been influenced in 1914 and 1939 to initiate war because of the changing military balance, although he agrees that there are no mono-causal explanations of war.

2. Dr. Terrence R. Fehner "National Responses to Technological Innovations in Weapons Systems, 1815 to the Present," Germantown, MD, History Associates, Inc., January 7, 1986, 79 pp. Historical examples used herein are taken from this study.

3. CAPT Wayne P. Hughes USN (Ret.), Fleet Tactics: Theory and Practice, Annapolis, MD: Naval Institute Press, 1986, pp. 202-204.

4. See an interesting article which argues this point by Rear Admiral V. Gulin and Captain 1st Rank I. Kondyrev, "Man and Technology in War," Morskoy Sbornik, No. 3, 1987, pp. 8-12.

5. See a recent article that argues this point by Captain John Williams, USMC, "The Quantum Leap," U.S. Naval Institute Proceedings, Vol. 113, No. 11, November 1987, pp. 63-69.

6. See the recent writings of Marshal of the Soviet Union V.D. Ogarkov, formerly Chief of the General Staff.

INITIAL DISTRIBUTION LIST

		No. Copies
1.	Defense Technical Information Center Cameron Station Alexandria, VA 22314	2
2.	Dudley Knox Library Naval Postgraduate School Monterey, CA 93943-5100	2
3.	Director of Research (Code 012) Naval Postgraduate School Monterey, CA 93943-5100	1
4.	Chairman Department of National Security Affairs (56) Naval Postgraduate School Monterey, CA 93943-5100	20
5.	Director, Net Assessment OSD/NA Room 3A930 Office of the Secretary of Defense Washington, D.C. 20301	5
6.	Deputy Chief of Naval Operations Plans, Policy and Operations Strategic Concepts Branch OP-603/PNT Room 4E486 Office of the Chief of Naval Operations Washington, D.C. 20350	5
7.	Deputy Chief of Naval Operations Plans, Policy and Operations OP-06/Room 4E592 PNT Office of the Chief of Naval Operations Washington, D.C. 20350	1
8.	Deputy Chief of Naval Operations Plans, Policy and Operations OP-60/Room 4E566 Office of the Chief of Naval Operations Washington, DC 20350	1
9.	Executive Director CNO Executive Panel Staff (OP-OOK) 4401 Ford Avenue Alexandria, VA 22301-0268	1
10.	Deputy Chief of Naval Operations Plans, Policy and Operations OP-65/Room 4E572 Office of the Chief of Naval Operations Washington, DC 20350	1

11. Deputy Under Secretary of the Navy — 1
Special Review and Analysis
Office of the Secretary of the Navy
Washington, DC 20350

12. Office of the Deputy Chief of Naval Operations — 1
Plans, Policy and Operations
06B/Room 4E592
Washington, DC 20350

13. HQ DNA/NASF — 1
Strategic Forces Division
Washington, DC 20350

14. Dr. Janet Wall/Fred Giessler — 2
Science Applications International Corp
205 Montecito Avenue
Monterey, CA 93940

15. CAPT Charles Pease, USN (Ret) — 1
United Technologies, Suite 700
1825 Eye Street, NW
Washington, DC 20006

16. Dr. Kleber S. Masterson — 1
Booz-Allen & Hamilton
Crystal Square #2
1725 Jefferson Davis Highway
Arlington, VA 22202-4158

17. Dr. Paul Davis — 1
The RAND Corporation
P.O. Box 2138
Santa Monica, CA 90406-2138

18. CDR Michael O. McCune, USN — 1
Competitive Strategies
Pentagon - Room 1E801/5
Washington, D.C. 20301

19. Barry Watts/Jim Roder — 2
Northrope Analysis Center, Suite 700
2 Lafayette Centre
1133 21st Street, NW
Washington, DC 20006

20. Dr. Frances X. Kane — 1
Rockwell Corporation
2230 East Imperial Highway
El Segundo, CA 90245

21. Philip L. Cantelon, President — 1
History Associates Incorporated
15809 Crabbs Branch Way
Rockville, MD 20855

22. Chairman 1
Department of National Security Affairs (Code 56Lx)
Naval Postgraduate School
Monterey, CA 93943

23. Chairman
Department of National Security Affairs (Code 56Lk) 1
Naval Postgraduate School
Monterey, CA 93943

24. Chairman 1
Operations Research Department (Code 55)
Naval Postgraudate School
Monterey, CA 93943

25. Chairman 1
Operations Research Department (Code 55HI)
Naval Postgraduate School
Monterey, CA 93943